

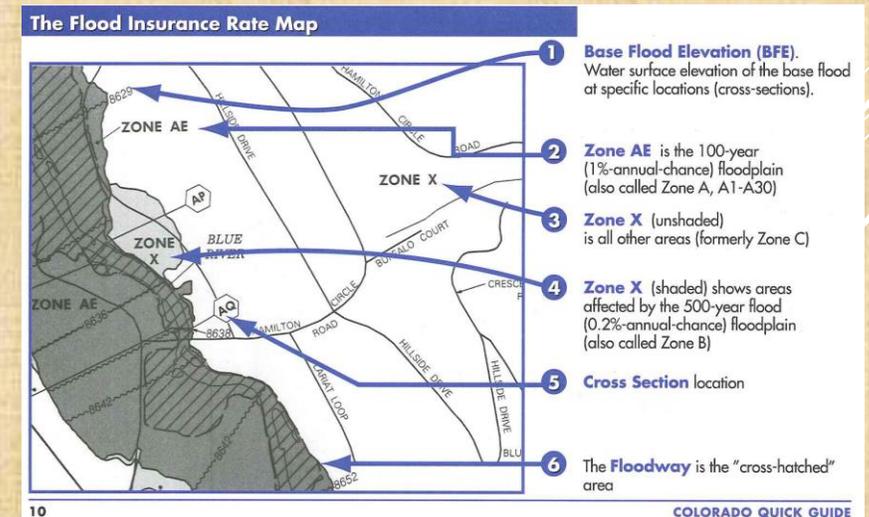
Recommendation to the Coast Smart Council 2017 Annual Report:



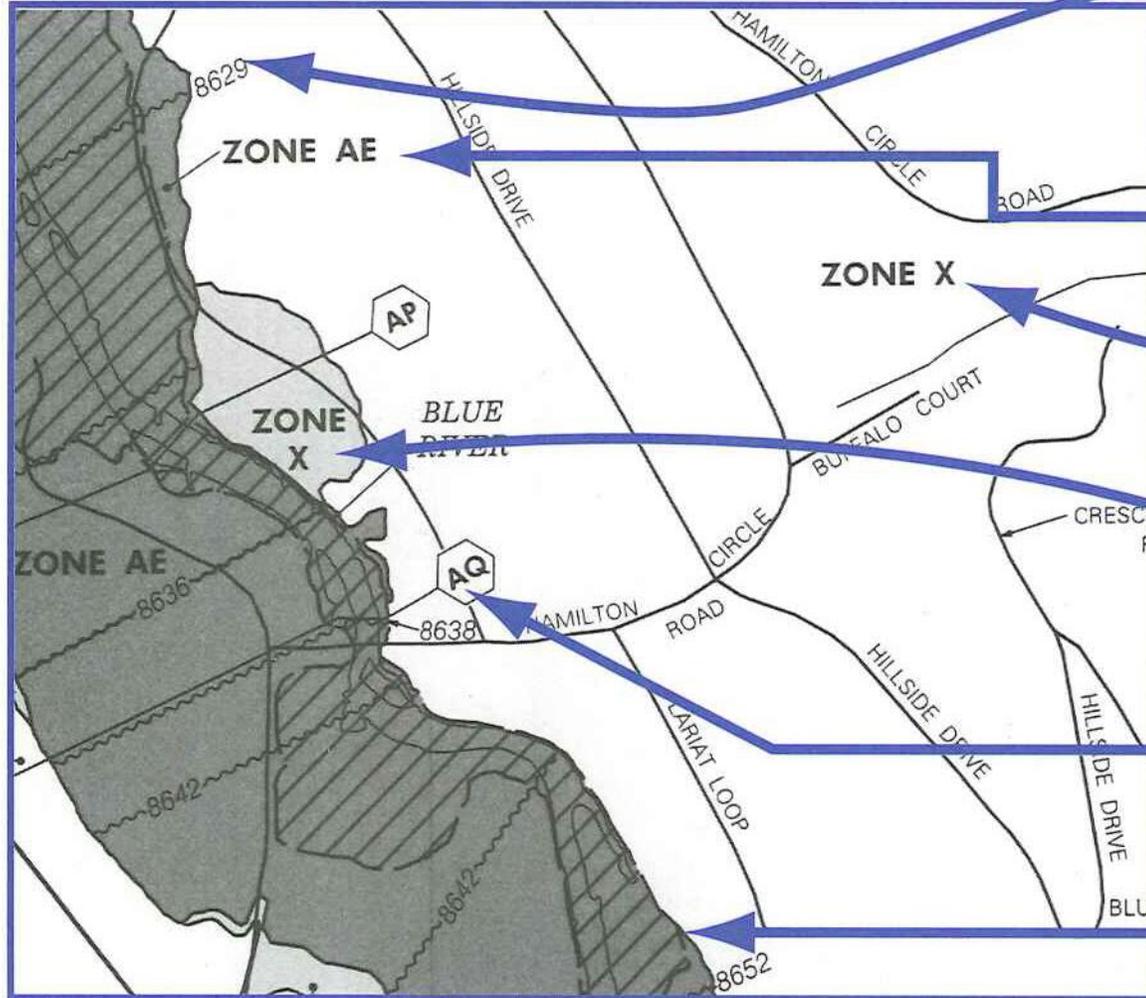
Recommend including a freeboard requirement to the Coast Smart Siting and Design Criteria for all state funded capital projects built by units of State Government located in a shaded flood zone X

Requiring State projects & State structures in flood zone X to elevate to a higher standard will benefit in the long run and help protect against the effects of flooding caused by some Towns & Municipalities that may lack enforcement of their own flood prevention code.

Presented by Kevin R. Brown
Town of Ocean City
Chief Building Official and Flood Plain Administrator



The Flood Insurance Rate Map



- 1 Base Flood Elevation (BFE).**
Water surface elevation of the base flood at specific locations (cross-sections).
- 2 Zone AE** is the 100-year (1%-annual-chance) floodplain (also called Zone A, A1-A30)
- 3 Zone X** (unshaded) is all other areas (formerly Zone C)
- 4 Zone X** (shaded) shows areas affected by the 500-year flood (0.2%-annual-chance) floodplain (also called Zone B)
- 5 Cross Section** location
- 6** The **Floodway** is the "cross-hatched" area

FEMA Flood Zone Designations.

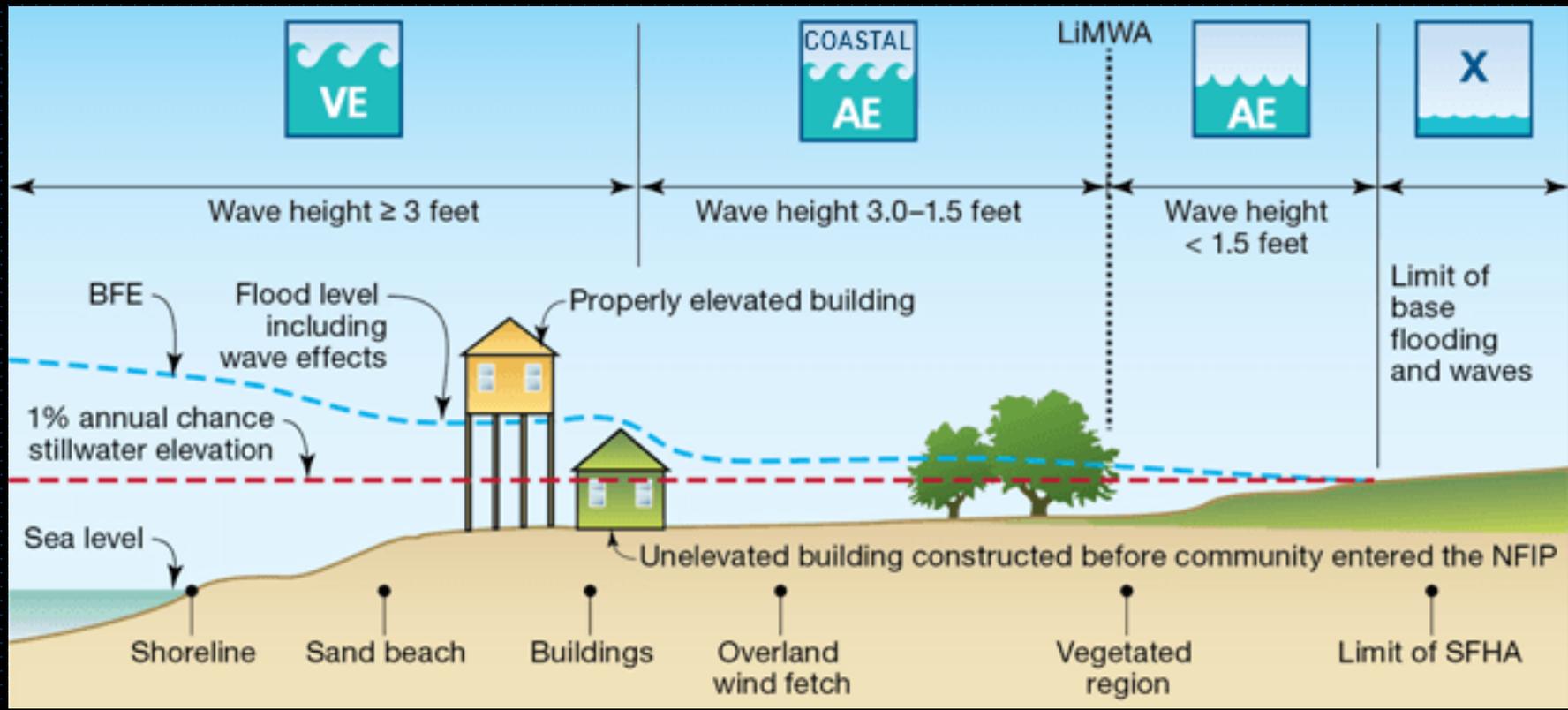
Flood zones are geographic areas that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's Flood Insurance Rate Map (FIRM) or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area.

Properties in Shaded Zone X are considered to be at moderate to low risk of flooding under the National Flood Insurance Program.

FIRMs do not account for the effect of future conditions flood hazards; future flood hazards may exceed present-day flood hazards because of sea level rise, coastal erosion, and other factors.

Flood Hazards of Special Concern

The mapping and regulatory standards of the National Flood Insurance Program (NFIP) are general standards and do not address every flood problem in the United States. Certain floodplains and flood-related hazards are less common, more destructive and harder to map than riverine, coastal, alluvial fan, and shallow flooding. Special hazards include coastal erosion, tsunamis, closed basin lakes, uncertain flow paths, dam breaks, ice jams, and mudflows.



Published by the American Society of Civil Engineers (ASCE), Flood Resistant Design and Construction, ASCE 24, is a referenced standard in the International Codes®

ASCE 24 warns that even the latest FIRMs and FISs may be based on limited or incomplete information and suggests that the community should always be contacted to obtain the latest information. Designers should not determine a zone designation from a FIRM with a higher degree of precision than intended. Several aspects of flood hazards and mapping should be considered:

- (1) the determination of flood hazard areas and maps involves detailed analysis, but also assumptions and judgment made by modelers;**
- (2) the base flood is a statement of probability;**
- (3) changes in land use over time contribute to increases in flood elevations in riverine areas;**
- (4) coastal flood mapping is sensitive to topography, which may change over time due to erosion and development; (5) base maps do not include sufficient scale to capture all ground elevations; and (6) the scale of most FIRMs is such that the width of the lines delineating zones can be a factor in determining whether a structure is in or out of a certain flood zone.**

Freeboard is a term used by FEMA's National Flood Insurance Program (NFIP) to describe a factor of safety

Benefits of Freeboard

There are many benefits to incorporating freeboard into new construction plans, the most important being safety (Figure 1). Freeboard provides a margin of safety against extraordinary or unknown flood risk. BFEs reflect estimates of flood risk, but there are many unknown factors that can cause flood heights to rise above the BFE, such as wave action, bridge and culvert openings being blocked by debris, and development in the floodplain.

Other benefits of freeboard include incurring less damage, easier and faster cleanup after a flood event, and lower flood insurance rates.

Historically Speaking... Freeboard was (and still is) a nautical term. It refers to the height of a ship's deck above the waterline. If you think of the lowest floor of your house as the deck of your ship, and the BFE as the height of the sea, freeboard is the extra height that keeps the larger waves off your deck.

One reason freeboard was introduced into building codes was to account for the inherent uncertainties associated with flood maps. Flood maps reflect the data collected at the time of mapping and should be considered a "snapshot in time." Changes to the land following the mapping (development or erosion) can drastically impact still water elevations and wave heights.

Moderate and Minimal Risk Areas

Areas of moderate or minimal hazard are studied based upon the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local storm water drainage systems are not normally considered in a community's flood insurance study. The failure of a local drainage system can create areas of high flood risk within these zones. Flood insurance is available in participating communities, but is not required by regulation in these zones. Nearly 25-percent of all flood claims filed are for structures located within these zones.

Zone X Shaded

Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. (Zone X (shaded) is used on new and revised maps in place of Zone B.)

Zone X Unshaded

Minimal risk areas outside the 1-percent and .2-percent-annual-chance floodplains. No BFEs or base flood depths are shown within these zones. (Zone X (unshaded) is used on new and revised maps in place of Zone C.)

Ending Statements

In theory, a 500-year flood is something that has a 1-in-500 shot of happening in any given year — in other words, the sort of event that's so rare that it might not make sense to plan around the possibility of it happening. The problem is that 500-year floods are happening more often than probability predicts — especially in Houston. And, especially in Houston, prevention planning hasn't evolved to acknowledge that a "500-year" flood isn't really a 1-in-500 chance anymore.

A 500-year flood is based on the same principle: Experts estimate that in any given year, there's a 1-in-500 (0.2 percent) chance a flood this bad will strike a particular area. In theory, that means that over 500 years, that will happen once.

The US appears to be getting hit with major storms with unusual frequency. From August 2015 to August 2016, there were eight 500-year flood events recorded by the National Weather Service. There were six "1,000-year" floods in the US over the five years from 2010 to 2014; in 2015 and 2016, though, there were at least three each year.

Ending Statements continued

Roads, parking lots, sidewalks, and other pavements, along with asphalt, concrete, brick, stone, and other building materials, combine to create impervious surfaces that resist the natural absorption of water.

Increases in sea level will cause impacts statewide, including temporary flooding or permanent inundation of wetlands and uplands, saltwater intrusion into freshwater supplies, and rising water tables.



Kevin Wagner

Maryland's National Flood Insurance Program (NFIP) Coordinating Office currently only examines projects in the Special Flood Hazard Area (SFHA) that include Zone A, Zone AE and Zone VE; areas of high flood risk. FEMA often provides a statistic that about 25% of all NFIP flood insurance claims are in areas outside the SFHA. That tells us one of two things, FEMA's maps are often wrong and/or the standard we currently use to regulate floodplain development isn't good enough. Zone X is further subdivided into two zones, Zone X (shaded) and Zone X (unshaded). A shaded Zone X is basically the 0.2% annual chance flood event, commonly referred to as the 500-year flood; it's considered an area of moderate flood risk. An unshaded Zone X is an area of low flood risk. Under the Maryland Coast Smart Construction Program, the only time a Zone X (shaded) comes into play under the existing State Executive Orders and siting guidelines is for Critical and Essential facilities (ex. Police, Fire, WWTP's, WTP's, etc.). A broader inclusion of Zone X would distinguish Maryland as a national leader. The Maryland Coast Smart Council should consider broader inclusion of flood Zone X to better protect Maryland communities and assets that are vulnerable coastal flooding, storm surge and sea-level rise and advance Maryland as a leader in coastal adaptation.